

**Oroville Facilities Relicensing
(Project No. 2100)**

SP-T2 Progress Summary

**SP-T2. Project Effects on Special Status Plant Species
December 2002**

Summary

A review of existing literature indicates the study area may support seven vascular plant species that are listed under FESA and/or CESA and an additional 56 species of concern, which includes five mosses and seven lichens. The study area may also support 21 species listed by the California Native Plant Society as List 4 species or by the USFS as Special Interest species.

Surveys for special status plant species began in late May 2002. Visits to known sites for each of the target species (identifiable at that time of year) were conducted prior to field surveys. Survey areas during the 2002 field season included Loafer Creek Campground, Bidwell Canyon Campground and Boat Ramp, Kelley Ridge Visitor Center, Thermalito Afterbay and surrounding grasslands, Oroville Wildlife Area ponds, and the Feather River floodplain downstream of the Fish Barrier Dam.

No State or federally "listed" species were found within the study area during the 2002 surveys. Two populations of Butte County calycadenia (CNPS List 1B) were found within the Loafer Creek Campground. A number of populations of four-angled spikerush (CNPS List 2) were found around the Thermalito Afterbay and ponds in the Oroville Wildlife Area. No other special status plant species were found within the study area.

During the winter 2002/03, background information on species and habitats will be used to plan the 2003 surveys. Surveys will begin in March 2002 and continue through August. All project features, USFS and BLM lands, and downstream Feather River will be surveyed.

For questions on this progress report please contact Gail Kuenster at (530) 529-7386.

Introduction

Existing and future operations of the Oroville Project facilities, power generation facilities, recreation facilities, and other activities associated with these facilities may affect special status plant species.

The evaluation of potential project impacts on special status species is required under the California Endangered Species (CESA) and Federal Endangered Species (FESA) acts, the California Environmental Quality Act and the National Environmental Policy Act. The U.S. Forest Service (USFS) and the U.S. Bureau of Land Management (USBLM) are also required to insure that project operations do not adversely affect sensitive species on federal lands. These special status species require special consideration related to project planning. This not only includes the individual species but their habitats as well.

Numerous special status plant species may occur within the project vicinity. These include species classified as threatened, endangered, or rare under the State or Federal Endangered Species acts ("listed" species), U.S. Forest Service (USFS) sensitive species, U.S. Bureau of Land Management (BLM) sensitive species, State and Federal species of concern, and species identified by the California Native Plant Society (CNPS). Although there are no known occurrences of Federal or State listed endangered, threatened, or rare plant species within the FERC project boundary, several occur nearby and suitable habitat may exist within the project area. Six species of concern are known to occur within the Project boundary.

Study Objective

The objective of this study is 1) to provide information on special status plant species occurrence and distribution within the study area; 2) provide information on potential project effects to special status plant species for use in consultation processes with State and Federal management agencies; and 3) provide information that can be used to identify opportunities for habitat protection and enhancement for special status plant species.

Study Area

The study area for this investigation includes the Federal Energy Regulatory Commission (FERC) Project Boundary and the lower Feather River floodplain downstream from the Fish Barrier Dam to the Sacramento River. The scope of study for each species will focus on areas of suitable habitat within the study area that may be affected by project activities. The scope of surveys for BLM and USFS Sensitive and Special Interest species will include federal lands within the study area, adjacent federal lands outside the study area, and State lands within the study area adjacent to federal lands. The study area may extend beyond the FERC Project boundary for evaluation of effects related to the analysis of project operations.

Methods

This report is an account of progress to date. Only Tasks 1 and 2 have been initiated and are covered in this report.

Task 1 – Collect existing information

Collect existing information and compile a list of special status plant species that have potential for occurring in or near the study area. This data will be compiled from 1) California Department of Fish and Game's (CDFG) Natural Diversity Database (CNDDDB) records; 2) U.S. Fish and Wildlife Service's list of federally endangered, threatened, and species of concern that have potential for occurring within or near the study area; 3) CNPS Inventory; 4) Plumas National Forest Sensitive Plant and Special Interest Species; 5) CDFG's Special Plants List; 6) other State and /or County biological survey records; and 7) USFS Pacific Southwest Region Sensitive Plant list. The list of special status plant species that have potential for occurring in or near the study area will be updated throughout the study as agencies and CNPS update their individual lists.

Conduct a literature review to collect additional distribution and ecology information. In addition, survey botanists will familiarize themselves with individual species morphology and ecology by visiting local herbaria and extant populations prior to field searches. Vegetation, soils maps, and aerial photographs will be used to help predict special status plant habitats within the study area.

Task 2 – Field surveys

Field surveys will be conducted according to the CNPS's 2001 Botanical Survey Guidelines (California Native Plant Society 2001). Surveys will be floristic in nature and will be conducted to coincide with the flowering period of the target species (or period when the species is identifiable). Some areas may need to be visited more than once if multiple species, with different flowering periods, have potential for occurring in the same area. Surveys will be focused in areas where project impacts are likely to occur and within 150 feet of all project facilities.

All plant species will be identified by qualified botanists (Appendix A). If a special status plant population is located, detailed site and population information will be recorded, a CNDDDB field survey form will be completed, the location mapped, and the population photographed. If voucher specimens are collected, these will be deposited with the California State University Chico Herbarium. On National Forest lands, voucher specimens are required for sensitive, special interest and species new to the Plumas County and Plumas National Forest flora. One specimen per project area shall be submitted to the Plumas National Forest. No collections will be required for rare plant populations of less than 20 individuals.

Results and Discussion

Task 1 – Collect existing information

A review of existing literature indicates that the study area may support seven vascular plant species that are listed under FESA and/or CESA and an additional 44 species of concern, as well as five mosses and seven lichens. These species of concern include former USFWS Category 2 candidate species and species of concern to USFS, BLM, and/or CNPS. Table 1 identifies listed plant species and species of concern that occur or have potential for occurring within the study area. The study area may support 21 additional species list by the California Native Plant Society as List 4 species or by USFS as Special Interest species (Table 2). These plants are considered to be limited in distribution and may warrant a higher listing in the future.

Table 1. Special status plant species with potential for occurring within the Oroville Facilities Project Area.

Scientific name	Status				Habitat (elevation)	Flowering period
Common name	FWS ¹	State ²	CNPS ³	PNF ⁴		
Federal or State listed						
<i>Chamaesyce hooveri</i> Hoover's spurge	FT		1B		Vernal pools (25-250m)	Jul-Aug
<i>Limnanthes floccosa</i> ssp. <i>californica</i> Butte County meadow foam	FE	SE	1B		Valley and foothill grassland (mesic), vernal pools (50-930m)	Mar-May
<i>Orcuttia pilosa</i> Hairy Orcutt grass	FE	SE	1B		Vernal pools (55-200m)	May-Sep
<i>Orcuttia tenuis</i> Slender Orcutt grass	FT	SE	1B		Vernal pools (35-1760m)	May-Oct
<i>Pseudobahia bahiifolia</i> Hartweg's golden sunburst	FE	SE	1B		Cismontane woodland, valley and foothill grassland/ clay (15-150m)	Mar-Apr
<i>Senecio layneae</i> Layne's ragwort	FT	SR	1B	FT	Chaparral, cismontane woodland/ serpentinite or gabbroic, rocky (200-1000m)	Apr-Jul
<i>Tuctoria greenei</i> Greene's tuctoria	FE	SR	1B		Vernal pools (30-1070m)	May-Sep
Species of Concern						
<i>Agrostis hendersonii</i> Henderson's bent grass	SC		3	SI-2	Valley and foothill grassland (mesic), vernal pools (70-305m)	Apr-May
<i>Allium jepsonii</i> Jepson's onion	SC		1B	S	Cismontane woodland, lower montane coniferous forest/ serpentinite or volcanic (300-1160m)	May-Aug
<i>Astragalus tener</i> var. <i>ferrisiae</i> Ferris's milk-vetch	SC		1B		Meadows and seeps (vernally mesic), valley and foothill grassland (subalkaline flats) (5-75m)	Apr-May
<i>Atriplex cordulata</i> Heartscale	SC		1B		Chenopod scrub, meadows and seeps, valley and foothill grassland (sandy)/ saline or alkaline (1-375m)	Apr-Oct
<i>Atriplex depressa</i> Brittlescale			1B		Chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools/ alkaline, clay (1-320m)	May-Oct
<i>Atriplex minuscula</i> Lesser saltscale			1B		Chenopod scrub, playas, valley and foothill grassland/ alkaline, sandy (15-200m)	May-Oct
<i>Atriplex subtilis</i> Subtle orache			1B		Valley and foothill grassland (40-100m)	Aug-Oct
<i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i> Big-scale balsamroot			1B	SI-1	Chaparral, cismontane woodland, valley and foothill grassland / sometimes serpentinite (90-1400m)	Mar-Jun

<i>Calycadenia oppositifolia</i> Butte County calycadenia		1B	S	Chaparral, cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland/ volcanic or serpentinite (215-945m)	Apr-Jul
<i>Calystegia atriplicifolia</i> ssp. <i>buttensis</i> Butte County morning glory	SC	1B	S	Lower montane coniferous forest (600-1200m)	May-Jul
<i>Cardamine pachystigma</i> var. <i>dissectifolia</i> Dissected-leaved toothwort		3	SI-1	Chaparral, lower montane coniferous forest/ usually serpentinite, rocky (255-2100m)	Feb-May
<i>Carex vulpinoidea</i> Fox sedge		2		Marshes and swamps (freshwater), riparian woodland (30-1200m)	May-Jun
<i>Castilleja rubicundula</i> ssp. <i>rubicundula</i> Pink creamsacs		1B		Chaparral (openings), cismontane woodland, meadows and seeps, valley and foothill grassland/ serpentinite (20-900m)	Apr-Jun
<i>Clarkia biloba</i> ssp. <i>brandegeae</i> Brandegee's clarkia		1B	S	Chaparral, cismontane woodland/ often roadcuts (295-885m)	May-Jul
<i>Clarkia gracilis</i> ssp. <i>albicaulis</i> White-stemmed clarkia		1B	S	Chaparral, cismontane woodland/ sometimes serpentinite (245-1085m)	May-Jul
<i>Clarkia mildrediae</i> ssp. <i>mildrediae</i> Mildred's clarkia		1B	SI-1	Cismontane woodland, lower montane coniferous forest/ sandy, usually granitic (245-1710m)	May-Aug
<i>Clarkia mosquinii</i> Mosquin's clarkia	SC ^o	1B	S	Cismontane woodland, lower montane coniferous forest/ rocky, roadsides (185-1170m)	May-Jul
<i>Cypripedium fasciculatum</i> Clustered lady's slipper	SC	4	S	Lower montane coniferous forest, north coast coniferous forest/ usually serpentinite seeps and stream beds (100-2435m)	Mar-Jul
<i>Delphinium recurvatum</i> Recurved larkspur	SC	1B		Chenopod scrub, cismontane woodland, valley and foothill grassland/ alkaline (3-750m)	Mar-May
<i>Downingia pusilla</i> Dwarf downingia		2		Valley and foothill grassland (mesic), vernal pools (1-445m)	Mar-May
<i>Eleocharis quadrangulata</i> Four-angled spikerush		2		Marshes and swamps (freshwater) (30-500m)	May-Sep
<i>Fritillaria eastwoodiae</i> Butte County Fritillary	SC	3	S	Chaparral, cismontane woodland, lower montane coniferous forest (openings)/ sometimes serpentinite (50-1500m)	Mar-May
<i>Fritillaria pluriflora</i> Adobe-lily	SC	1B		Chaparral, cismontane woodland, valley and foothill grassland/ often adobe (60-705m)	Feb-Apr
<i>Hibiscus lasiocarpus</i> Rose-mallow		2		Marshes and swamps (freshwater) (0-120m)	Jun-Sep
<i>Juncus leiospermus</i> var. <i>ahartii</i> Ahart's dwarf rush	SC	1B		Valley and foothill grasslands (mesic) (30-100m)	Mar-May
<i>Juncus leiospermus</i> var. <i>leiospermus</i> Red Bluff dwarf rush		1B		Chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, vernal pools/ vernally mesic (35-1020m)	Mar-May
<i>Lewisia cantelovii</i> Cantelow's lewisia		1B	S	Broadleaved upland forest, chaparral, cismontane woodland, Lower montane coniferous forest/ mesic, granitic, sometimes serpentinite seeps (385-1370m)	May-Oct
<i>Lupinus dalesiae</i> Quincy lupine		1B	S	Chaparral, cismontane woodland, lower montane coniferous forest, upper montane coniferous forest/ openings, often in disturbed areas (855-2500m)	May-Aug
<i>Monardella douglasii</i> ssp. <i>venosa</i> Veiny monardella	SC	1B		Cismontane woodland, valley and foothill grassland (heavy clay) (60-410m)	May-Jul
<i>Myosurus minimus</i> ssp. <i>apus</i> Little mousetail	SC		3	Valley and foothill woodland, vernal pools (alkaline) (20-640m)	Mar-Jun
<i>Paronychia ahartii</i> Ahart's paronychia	SC	1B		Cismontane woodland, valley and foothill grassland, vernal pools (30-510m)	Mar-Jun
<i>Penstemon personatus</i> Closed-throated beardtongue	SC	1B	S	Chaparral, lower montane coniferous forest, upper montane coniferous forest/ metavolcanic (1065-2120m)	Jun-Sep

<i>Rhynchospora californica</i> California beaked-rush	SC	1B		Bogs and fens, lower montane coniferous forest, meadows and seeps (seeps), marshes and swamps (freshwater) (45-1010m)	May-July
<i>Rhynchospora capitellata</i> Brownish beaked-rush		2	SI-1	Lower montane coniferous forest, meadows and seeps, marshes and swamps, upper montane coniferous forest/ mesic (455-2000m)	Jul-Aug
<i>Sagittaria sanfordii</i> Sanford's arrowhead	SC	1B		Marshes and swamps (assorted shallow freshwater) (0-610m)	May-Oct
<i>Sanicula tracyi</i> Tracy's sanicle	SC ⁶	4		Cismontane woodland, lower montane coniferous forest, upper montane coniferous forest/ openings (100-1585m)	Apr-Jul
<i>Sedum albomarginatum</i> Feather River stonecrop		1B	S	Chaparral, lower montane coniferous forest/ serpentinite (260-1785m)	May-Jun
<i>Senecio eurycephalus</i> var. <i>lewisroei</i> Cut-leaved ragwort		1B	S	Chaparral, cismontane woodland, cower montane coniferous forest/ serpentinite (550-1470m)	Mar-Sep
<i>Sidalcea robusta</i> Butte County checkerbloom	SC	1B		Chaparral, cismontane woodland (90-1600m)	Apr-Jun
<i>Silene occidentalis</i> ssp. <i>longistipitata</i> Long-stiped catchfly	SC	1B	SI-1	Chaparral, lower montane coniferous forest, upper montane coniferous forest (1000-2000m)	Jul-Aug
<i>Trichocoronis wrightii</i> var. <i>wrightii</i> Wright's trichocoronis		2		Meadows and seeps, marshes and swamps, riparian scrub, vernal pools/ alkaline (5-435m)	May-Sep
<i>Trifolium jokerstii</i> Butte County golden clover		1B	SI-1	Valley and foothill grassland (mesic), vernal pools (50-385m)	Apr-May
<i>Vaccinium coccineum</i> Siskiyou Mountains huckleberry		3	SI-1	Lower montane coniferous forest, upper montane coniferous forest/ often serpentinite (1095-2135m)	Jun-Aug
<i>Wolffia brasiliensis</i> Columbian watermeal		2		Marshes and swamps (assorted shallow freshwater) (30-100m)	Apr-Dec
Bryophytes (mosses)					
<i>Anomobryum filiforme</i> Filiform anomobryum moss		2	SI-1	Broadleaved upland forest, lower montane coniferous forest, North Coast coniferous forest/ damp rock and soil on outcrops, usually on roadcuts (100-1000m)	
<i>Bruchia bolanderi</i> Bolander's bruchia moss		2	S	Lower montane coniferous forest, meadows and seeps, upper montane coniferous forest/ damp soil (600-1700m)	
<i>Meesia triquetra</i> Meesia moss		2	S	Bog and fens, meadows and seeps, upper montane coniferous forest (mesic)/ soil (1300-2500m)	
<i>Meesia uliginosa</i> Meesia moss		2	S	Meadows and seeps, upper montane coniferous forest/ damp soil (1300-2500m)	
<i>Mielichhoferia elongata</i> Elongate copper moss		2	SI-1	Cismontane woodland (metamorphic rock, usually vernal mesic) (500-1300m)	
Lichens					
<i>Caloplaca subpyraceella</i> Orange lichen			SI-1		
<i>Hydrothyria venosa</i> Waterfan			S	Attached to rocks in cool mountain brooks and streams; must grow entirely submerged in fresh water	
<i>Phaeophyscia decolor</i> Starburst shadow lichen			SI-1	On rock in exposed situations	
<i>Protoparmelia badia</i> Chocolate rim-lichens			SI-1	On granitic rocks, usually in well-lit sites	
<i>Rhizoplaca glaucophana</i> Rimmed navel lichen			SI-1	On siliceous or calcareous rock, or unattached (vagrant) on soil, in open, especially dry sites	
<i>Rhizoplaca marginalis</i> Rimmed navel lichen			SI-1	On siliceous or calcareous rock, or unattached (vagrant) on soil, in open, especially dry sites	

<i>Xanthoparmelia mougeotii</i> Rock-shield lichens	SI-1	On rocks, especially siliceous, noncalcareous types, and on mineral soil; most species in open, relatively dry sites, although a few species can tolerate shade and thrive on forest boulders; very rarely, on hard weathered wood
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¹ United States Fish and Wildlife Service (FWS): FE - federal endangered, FT - federal threatened, SC - federal species of concern (not a formal listing).

² California Department of Fish and Game (DFG): SE - State endangered, SR - State rare.

³ California Native Plant Society (CNPS): List 1B - plants rare, threatened, or endangered in California and elsewhere; List 2 - plants rare, threatened, or endangered in California but more common elsewhere; List 3 - plants about which more information is needed; List 4 - plants of limited distribution.

⁴ Plumas National Forest (PNF): S - Sensitive; SI-1 - Special Interest category 1 (Survey and recommend conservation measures); SI-2 - Special Interest category 2 (Report occurrences and recommend conservation measures).

⁵ FWS recognizes two subspecies of *Clarkia mosquinii*, ssp. *mosquinii* and ssp. *xerophila*, both as SC.

⁶ Although FWS lists this species as within the vicinity of the project area, PNF and CNPS consider it to only occur in Humboldt and Trinity Counties.

Table 2. Low priority special status plant species with potential for occurring within the Oroville Facilities Project Area.

Scientific name Common name	Status		Habitat (elevation)	Flowering Period
	CNPS ¹	PNF ²		
<i>Allium sanbornii</i> var. <i>sanbornii</i> Sanborn's onion	4	SI-1	Chaparral, cismontane woodland, lower montane coniferous forest/ usually serpentinite, gravelly (260-1410m)	May-Sep
<i>Arenaria "grandiflora"</i> Large-flowered sandwort		SI-1	Granite sand on road banks and openings in woods (500-1000m)	Apr-Aug
<i>Astragalus pauperculus</i> Depauperate milk-vetch	4		Chaparral, cismontane woodland, valley and foothill grassland/ vernal mesic, volcanic (60-855m)	Mar-Jun
<i>Azolla mexicana</i> Mexican mosquito fern	4		Marshes and swamps (ponds, slow water) (30-100m)	Aug
<i>Bulbostylis capillaris</i> Thread-leaved beakseed	4	SI-2	Lower montane coniferous forest, meadows and seeps, upper montane coniferous forest (395-2075m)	Jun-Aug
<i>Clarkia mildrediae</i> ssp. <i>lutescens</i> Golden-anthered clarkia	4	SI-1	Cismontane woodland, lower montane coniferous forest (openings)/ often roadcuts (275-1750m)	Jun-Aug
<i>Eleocharis parvula</i> Small spikerush	4		Marshes and swamps (1-2530m)	Jun-Sep
<i>Erigeron petrophilus</i> var. <i>sierrensis</i> Northern Sierra daisy	4	SI-2	Cismontane woodland, lower montane coniferous forest, upper montane coniferous forest/ sometimes serpentinite (300-1980m)	Jun-Oct
<i>Hesperis matronalis</i> Hogwallow starfish	4		Valley and foothill grassland (mesic, clay) (0-505m)	Mar-Jun
<i>Lasthenia ferrisae</i> Ferris's goldfields	4		Vernal pools (alkaline, clay) (20-700m)	Feb-May
<i>Lilium humboldtii</i> ssp. <i>humboldtii</i> Humboldt lily	4	SI-1	Chaparral, lower coniferous forest/ openings (30-1800m)	May-Jul
<i>Microseris sylvatica</i> Sylvan microseris	4		Chaparral, cismontane woodland, Great Basin scrub, pinyon and juniper woodland, valley and foothill grassland (serpentinite) (45-1500m)	Mar-Jun
<i>Mimulus glaucescens</i> Shield-bracted monkeyflower	4	SI-1	Chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland/ serpentinite seeps (60-1240m)	Feb-Aug
<i>Mimulus laciniatus</i> Cut-leaved monkeyflower	4		Chaparral, lower montane coniferous forest, upper montane coniferous forest/ mesic, granitic (490-2650m)	Apr-Jul

<i>Navarretia cotulifolia</i> Cotula navarretia	4		Chaparral, cismontane woodland, valley and foothill grassland/ adobe (4-1830m)	May-Jun
<i>Navarretia heterandra</i> Tehama navarretia	4		Valley and foothill grassland (mesic), vernal pools (30-945m)	Apr-Jun
<i>Perideridia bacigalupii</i> Bacigalupi's yampah	4	SI-1	Chaparral, lower montane coniferous forest/ serpentinite (450-1000m)	Jun-Aug
<i>Piperia colemanii</i> Coleman's rein orchid	4		Chaparral, lower montane coniferous forest/ often sandy (1200-2300m)	Jun-Aug
<i>Stellaria obtusa</i> Obtuse starwort	4		Upper montane coniferous forest/ mesic (150-2135m)	May-Oct
<i>Streptanthus drepanoides</i> Sickle-fruit jewel-flower	4		Chaparral, cismontane woodland, lower montane coniferous forest/ serpentinite (275-1660m)	Apr-Jun
<i>Viola tomentosa</i> Woolly violet	4	SI-1	Lower montane coniferous forest, subalpine coniferous forest, upper montane coniferous forest/ gravelly (1435-2000m)	May-Oct

¹ California Native Plant Society (CNPS): List 1B - plants rare, threatened, or endangered in California and elsewhere; List 2 - plants rare, threatened, or endangered in California but more common elsewhere; List 3 - plants about which more information is needed; List 4 - plants of limited distribution.

²Plumas National Forest (PNF): S - Sensitive; SI-1 - Special Interest category 1 (Survey and recommend conservation measures); SI-2 - Special Interest category 2 (Report occurrences and recommend conservation measures).

There are no known occurrences of Federal or State listed endangered, threatened, or rare plant species within the study area. Five of the seven Federal or State listed species are associated with vernal pools or ephemeral drainages in the Central Valley. These include the Butte County meadowfoam, hairy Orcutt grass, slender Orcutt grass, Greene's tuctoria, and Hoover's spurge. Layne's ragwort occurs in the eastern foothills of the Central Valley on serpentine soils and Hartweg's golden sunburst on clay soils in annual grassland and open woodland. The status, distribution, and habitat requirement for each of these species follows.

Butte County meadowfoam

Butte County meadowfoam (*Limnanthes floccosa* ssp. *californica*) is an annual herb in the false mermaid family (Limnanthaceae). It is both a Federal and State list endangered species. This species appears in late March to early May in ephemeral drainages, vernal pool depressions in ephemeral drainages, and occasionally around the edges of isolated vernal pools. It is restricted to a narrow 25-mile strip along the eastern margin of the Sacramento Valley in Butte County.

Sixteen of the eighteen remaining populations of Butte County meadowfoam occur on private land and are subject to urban development, agricultural land conversion, and highway widening or realignment (Fed. Register, March 26, 1997). Two populations are known from approximately five miles north of the Thermalito Afterbay. Suitable habitat for this species exists within the study area.

Hairy Orcutt grass

Hairy Orcutt grass (*Orcuttia pilosa*) is an annual herb in the grass family (Poaceae). It is both a Federal and State listed endangered species. It occurs in drying vernal pools along the eastern margin of the Central Valley from May to September.

Of the original 34 known populations of hairy Orcutt grass, eleven are thought to have been extirpated due to agricultural land conversion, urbanization, and intensive cattle grazing (Federal Register, March 26, 1997). A population is known within five miles of the project boundary and suitable habitat for the hairy Orcutt grass exists within the study area.

Slender Orcutt grass

Slender Orcutt grass (*Orcuttia tenuis*) is an annual herb in the grass family (Poaceae). It is listed as a federally threatened species and a California endangered species. It occurs in drying vernal pools in Northern California from May to October.

There are 39 known populations of the slender Orcutt grass. Although new populations discovered recently have extended its range, the overall trend is one of decline due to habitat alteration and loss (Federal Register, March 26, 1997). Suitable habitat for this species exists within the study area.

Greene's tuctoria

Greene's tuctoria (*Tuctoria greenei*) is an annual herb in the grass family (Poaceae). It is listed as a federally endangered species and a California rare species. It occurs in drying ephemeral wetlands or vernal pools along the eastern margin of the California Central Valley from May to September.

Thirty-eight populations have been documented from Fresno to Shasta Counties. However, nineteen of these populations from Fresno, Madera, Stanislaus, Tulare, and San Joaquin Counties are thought to have been extirpated. The remaining populations occur in Butte, Glenn, Merced, Shasta, and Tehama Counties. All populations are on private lands except one population at the Sacramento National Wildlife Refuge. One population occurs just west of Hwy 99 within ¼ mile and another within five miles of the project boundary. Suitable habitat for this species exists within the study area.

Hoover's spurge

Hoover's spurge (*Chamaesyce hooveri*) is a federally listed threatened species. This annual herb in the spurge family (Euphorbiaceae) is found in relatively large vernal pools on the eastern margin of the Central Valley from July to August.

There are 25 known populations of Hoover's spurge from Tulare, Merced, Stanislaus, Glenn, Butte, and Tehama Counties. All are on private lands except for four populations

in Glenn County on the Sacramento National Wildlife Refuge. Loss of vernal pool habitat to irrigated agriculture is the biggest threat to this species. The nearest population occurs approximately five miles north of the project boundary. Suitable habitat for this species exists within the study area.

Hartweg's golden sunburst

Hartweg's golden sunburst (*Pseudobahia bahifolia*) is an annual herb in the sunflower family (Asteraceae). It is a federally and State listed endangered species. This species is found on clay soils in annual grasslands and open woodlands and flowers from March through April.

There are 15 remaining populations identified in the CNDDDB in Madera, Fresno, and Stanislaus Counties. Hartweg's golden sunburst is also known in Yuba County from the floodplain of the lower Feather River. A historic population of Hartweg's golden sunburst was documented on the bank near the junction of the Yuba and Feather rivers. This type locality has been extirpated. There is little probability of finding this plant within the study area.

Layne's ragwort

Layne's ragwort (*Senecio layneae*) is a federally threatened and California rare species. It is a perennial herb in the sunflower family (Asteraceae) found in open pine and oak woodland on serpentine soils. It flowers from April to July.

There are 43 records of Layne's ragwort identified in the CNDDDB from El Dorado, Tuolumne, and Yuba Counties. Four of these are thought to have been extirpated. Thirty-four of the remaining populations occur in El Dorado County and are threatened by urbanization. One population occurs in Yuba County near Brownsville. Suitable habitat occurs within the study area.

Species of concern

Six plant species of concern are known to occur within the Project boundary. These include Mosquin's clarkia, Ahart's dwarf rush, fox sedge, four-angled spikerush, Butte County calycadenia, and Brandegees' clarkia. Status, species information, and habitat requirements for these species are provided in Tables 1 and 2.

Task 2 – Field surveys

Surveys for special status plant species began in late May 2002. A review of aerial photographs, soil maps, and site visits were used to determine potential habitat in and near project features for each of the plant species identified in Tables 1 and 2. Visits to known sites for each of the target species (those identified for habitat and appropriate flowering periods) were conducted prior to field surveys. All identifiable plant species

occurring in the area were recorded. Botanical field personnel who have or will conduct rare plant surveys for this project are listed in Appendix A.

Loafer Creek Campground

Surveys were conducted in and around all features of the campground during June and early July. This included the horse camp, trails, campgrounds, roads, boat ramps, and day-use areas. The elevation range is approximately 900-1000 feet. No serpentine soils are known within this area. No habitat exists at this site for any federally or State listed plant species. Vegetation is comprised of large dense stands of interior live oak woodland with scattered foothill pine and occasional black oak; open blue oak woodland with scattered foothill pine in areas with flat to gentle slopes; and smaller areas of manzanita and ceanothus chaparral and open annual grassland. All drainages within the campground are ephemeral in nature and have no woody riparian vegetation. Herbaceous wetland species occur along the shaded drainages. Potential habitat exists for a number of species of concern. The target species with appropriate flowering periods for these surveys include Brandegee's clarkia, Mildred's clarkia, mosquin's clarkia, white-stemmed clarkia, Butte County checkerbloom, and Butte County calycadenia. .

Two populations of Butte County calycadenia (CNPS List 1B) were found within the Loafer Creek Campground. Both populations were found in open, sparsely vegetated grassland areas near trails and could be impacted by trail maintenance or widening. These sites have been recorded and mapped. Site records will be furnished to CNDDB and the California State Parks and Recreation personnel. No other special status plant species were found within the Campground. Habitat also exists for earlier flowering species. Surveys will continue in March 2003 through the summer for all special status plant species that have potential for occurring at this site.

Bidwell Canyon Campground and Boat Ramp

Surveys were conducted in and around all features during June and early July. These included trails, the campground, roads, and the boat ramp. No habitat exists in this area for any federally or State listed plant species. The elevation is approximately 1000 feet with no serpentine soils. Vegetation at this site is comprised of interior live oak woodland with scattered foothill pine, manzanita/ceanothus chaparral and small areas of open grassland. All drainages are ephemeral in nature and have no woody riparian vegetation. A small amount of potential habitat exists for a number of species of concern. The target species with appropriate flowering periods for these surveys include Brandegee's clarkia, Mildred's clarkia, mosquin's clarkia, white-stemmed clarkia, Butte County checkerbloom, and Butte County calycadenia.

No special status plant species were found. Habitat does exist for earlier flowering species. Surveys will continue in March 2003 through the summer for all special status plant species that have potential for occurring at this site.

Kelly Ridge Visitor Center

Surveys were conducted in and around all features of the Visitor Center during June and early July. These included trails, structures, and parking areas. No habitat exists at this site for any federally or State listed plant species. The elevation range is approximately 1000-1200 feet. No serpentine soils are known within this area. Vegetation at this site is comprised of large dense stands of interior live oak woodland with scattered foothill pine; open blue oak woodland with scattered foothill pine in areas with flat to gentle slopes; and smaller areas of manzanita and ceanothus chaparral and open annual grassland. All drainages within this area are ephemeral in nature and have no woody riparian vegetation. A small amount of potential habitat exists for a number of species of concern. The target species with appropriate flowering periods for these surveys include Brandegee's clarkia, Mildred's clarkia, mosquin's clarkia, white-stemmed clarkia, Butte County checkerbloom, and Butte County calycadenia.

No special status plant species were found. Habitat does exist for earlier flowering species. Surveys will continue in March through August 2003 for all special status plant species that have potential for occurring at this site.

Thermalito Afterbay

Surveys were conducted in and around features of the Thermalito Afterbay during July and August. These surveys included shoreline vegetation associated with the Afterbay and vernal pool complexes in the adjacent annual grassland. Elevations range from 150-200 feet. There is approximately 28 miles of shoreline vegetation around the Afterbay consisting of distinct bands of emergent vegetation. Rush (*Juncus effuses*) occurs nearest the water edge. This area is inundated frequently and soils remain wet even during the drawdown periods. Above this, a band of taller mixed emergent vegetation occurs in a zone which is inundated periodically but the top layers of soil dry out. Depressions in this area tend to hold water and support tall emergent vegetation such as cattails (*Typha* sp.) and tules (*Scirpus acutus*). Scattered Fremont cottonwood (*Populus fremontii*) and other riparian species occur throughout some areas. Annual grassland occurs above the emergent vegetation. Numerous natural vernal pools and ephemeral swales occur throughout this area.

Five of the seven federally and State listed plant species inhabit vernal pool/swale complexes and have potential to occur in this area. Four are summer annuals. These include Hoover's spurge (*Chamaesyce hooveri*), hairy Orcutt grass (*Orcuttia pilosa*), slender Orcutt grass (*Orcuttia tenuis*), and Greene's tuctoria (*Tuctoria greenei*). The fifth vernal pool species, Butte County meadowfoam, flowers in March to May.

None of the federally or State listed species have potential for occurring within the emergent vegetation bands around the Afterbay. However, this habitat could support a number of species of concern. Three are present during the late summer, Sanford's arrowhead (*Sagittaria sanfordii*), four-angled spikerush (*Eleocharis quadrangulata*), and rose-mallow (*Hibiscus lasiocarpus*).

A limited number of vernal pools were visited this year. No listed species were found. Surveys will continue in March through August 2003. An analysis of all pools in the project area as potential habitat for each of the listed species will begin in February 2003. The pools and swales identified as potential habitat for the listed plant species may differ from those identified in the Draft Vernal Pool Invertebrate Land Management Plan by Thomas Boullion of the Department of Water Resources.

Approximately nine miles of shoreline around the Afterbay were surveyed this year. A number of large populations of four-angled spikerush (*Eleocharis quadrangulata*), a CNPS List 2 species, were found in the upper emergent zone depressions where water stays ponded even during long draw downs. Another large population was found bordering a brood pond. These sites have been recorded and mapped. Site records will be furnished to CNDDDB. No other special status plant species were found during these surveys. Surveys will continue in March through September 2003 for all special status plant species that have potential for occurring in this area.

Oroville Wildlife Area Ponds

A number of ponds in the Oroville Wildlife Area could potentially support special status plant species. Surveys were conducted in this area during July, August, and September. The elevation ranges from approximately 100-150 feet. No habitat exists in or near the ponds that would support any of the federally or State listed species.

These ponds range in size from <.1 acre to over 100 acres (One-Mile Pond). This area was historically mined for placer gold and now consists chiefly of dredge tailings. Because of the porous nature of these gravels, ground water seems to feed many of the ponds with a constant source of freshwater. Study plan W5 is looking at the hydrologic connection between the Feather River and the ground water in the area. Open riparian vegetation occurs around most of the ponds. The most common riparian trees include Fremont's cottonwood and black willow. Aquatic vegetation is thick in some ponds. Common species include the water-milfoils (*Myriophyllum* spp.), hornwort (*Ceratophyllum demersum*), waterweeds (*Elodea* spp.), and water primrose (*Ludwigia peploides* ssp. *peploides*). Free-floating aquatic species such as water meal (*Wolffia* sp.), mud-midget (*Wolffiella lingulata*) and mosquito fern (*Azolla mexicana*) commonly cover some of the small to mid-sized ponds. This habitat could support a number of species of concern around the margins of the ponds. Three are present during the late summer, Sanford's arrowhead (*Sagittaria sanfordii*), four-angled spikerush (*Eleocharis quadrangulata*), and rose-mallow (*Hibiscus lasiocarpus*).

A number of large populations of four-angled spikerush (*Eleocharis quadrangulata*) were found in this area. These sites have been recorded and mapped. Site records will be furnished to CNDDDB. No other special status plant species were found during these surveys, however habitat also exists for earlier flowering species. Surveys will continue in March 2003 through the summer for all special status plant species that have potential for occurring in this habitat.

Lower Feather River

Surveys for special status plant species were conducted along the Feather River downstream of the Fish Barrier Dam. These studies coincided with studies from SP-T4 (vegetation mapping), SP-T7 (noxious weeds), and SP-T3/5 (riparian and wetland communities). Riparian vegetation along the river varies from sparse to dense. Much of the river is leveed, at least on one side, and inhibits the riparian growth to a small strip between the waters edge and the levee top. Wider floodplain areas support open to dense stands of riparian vegetation or sparse to open stands if disturbance is common. Back channels or slow moving water support dense to open stands of aquatic plant species. A number of noxious weed species were mapped within the riparian zone along the Feather River.

The Hartweg's golden sunburst (*Pseudobahia bahifolia*) was historically found in Yuba County from the floodplain of the lower Feather River. It is now known only from Madera, Fresno, and Stanislaus Counties on clay soils in annual grasslands and open woodlands. No habitat exists along the Feather River floodplain for any of the other federally or State listed plant species. However, habitat does exist that could support a number of species of concern. Three are present during the late summer, Sanford's arrowhead (*Sagittaria sanfordii*), four-angled spikerush (*Eleocharis quadrangulata*), and rose-mallow (*Hibiscus lasiocarpus*).

No special status plant species were found along the Feather River floodplain below the Fish Barrier Dam during this year's surveys. Surveys will continue in March through August 2003.

Further Studies

During the winter 2002/03, background information on species and habitats will be used to plan the 2003 surveys. Surveys will begin in March 2003 and continue through August. All project features, USFS and BLM lands, and downstream Feather River will be surveyed.

References

The following references were used to compile the lists of potential special status plant species that have potential for occurring within the study area and to determine additional distribution and ecological information on each species.

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Appendix A

Botanical Survey Personnel – Years of experience /rare plant surveys

Gail Kuenster - Environmental Scientist/Botanist - 15 years experience

Lawrence Janeway - Environmental Scientist/Botanist - 15+ years experience

Beth Hendrickson - Environmental Scientist/Botanist - 15+ years experience

Harry Spanglet - Environmental Scientist/Botanist - 3 years experience

Shirley Innecken - Fish and Wildlife Scientific Aid - 2+ years experience